MECHANICAL BEHAVIOR OF NANO FILLER RED MUD REINFORCED POLYMER MATRIX COMPOSITES BY AN EXPERIMENTAL ANALYSIS

A PROJECT REPORT

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BONAFIDE CERTIFICATE

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Abstract

This research article has a review of the compressive behaviour of natural fibre with nano particle reinforced polymer composites. In general, related to natural fibres and nano fillers or particles are has numbers of research works are increased recently. Natural fibers and nano fillers are becoming an attractive to researchers, engineers and scientists, because it has much more inherent properties, to prove that natural fibers are basically low cost, better mechanical properties, non-abrasive, eco-friendly and bio-degradability characteristics. This research work mainly showcases to evaluate the compressive behaviour of fabricated composites. In that the composite plates are comprises areca fiber as reinforcement, red mud as a nano fillers or particles and is opthalic polyester resin role as a matrix. The various fabricated specimens consists matrix alone, fiber with matrix, fiber with particulate and matrix, particulate with matrix. The fabricated composites have sizing based on the ASTM standard of compressive specimen. The compressive test was carried out for each specimen's such matrix alone, fiber with matrix, fiber with particulate and matrix, particulate with matrix. Finally the maximum experimental compressive strength of composite was 47MPa which comprises 20% of fiber, 10% of red mud nano filler and 70% of resign.

CHAPTER 4

Result and Discussion

4.1. Chemical Treatment

Alkaline treatment or mercerization is one of the most used chemical treatments of natural fibres when used to reinforce thermoplastics and thermosets. The important modification done by alkaline treatment is the disruption of hydrogen bonding in the network structure, thereby increasing surface roughness.

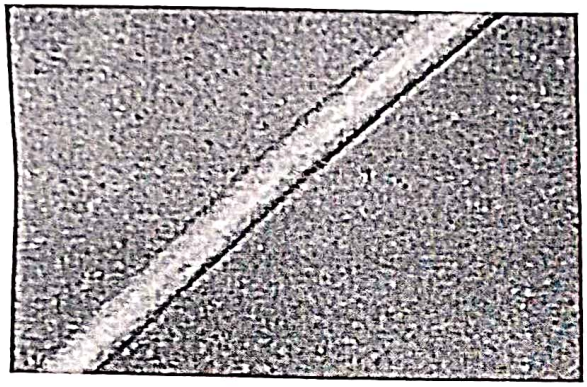

Figure 3a Before alkaline treatment

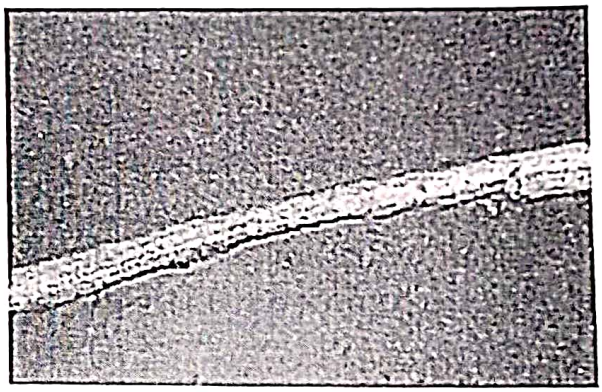

Figure 3bAfter alkaline treatment

This treatment removes a certain amount of lignin, wax and oils covering the external surface of the fiber cell wall, depolymerizes cellulose and exposes the short length crystallites. Addition of aqueous sodium hydroxide (NaOH) to natural fiber promotes the ionization of the hydroxyl group to the alkoxide. The figure 3 evidently exposes the effect of alkaline treatment to the surface of areca fiber. The alkaline treatment was carried out by sodium hydroxide (NaOH) about the solution concentration of 15% and the areca fiber was soaked at 30 hours.

4.2. Effect of red mud nano filler on compressive behaviour

Composite fabrication and testing

A significant increase of compressive properties was obtained in treated areca fiber-reinforced polyester composites. The tested compressive property values of treated areca-polyester and nano particles filled composites are given in Table 4.